

Pre-fired charcoal grill

United States Patent Application

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A continuation in part of Patent Application 10/448,010

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Related U.S. Patent applications

- 5 This application is a continuation in part of U.S. Patent Application serial number 10/448,010, filed on June 5, 2003.

Background of the Invention

- 10 This invention relates generally to the field of outdoor grills and barbecue units.

More specifically, this invention is directed to a barbecue unit containing a firebox for pre-ignition and heating of the charcoal prior to moving under the cooking grills. The unit can be portable or stationary in an island setting.

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In recent times, many improvements have been made to barbecue grills. Gas barbecue grills provide faster cooking time and steady temperature control; however, they cannot provide the charcoal flavor that many had come to love and associate with barbecue food.

- 20 Different mechanisms are utilized to supply forced air into the existing charcoal barbecue units to control heat temperature; however, none of these inventions are seen to include the type of feature that could supply variable volume of airflow needed for purposes such as to direct more air in for a quicker start of the charcoal fire. This invention answers the dilemma of the slow and uneven start of the charcoal fire by attaching an air supply that could provide
- 25 variable and controllable air volume when needed.

- Furthermore, existing charcoal grills start the charcoal ignition process with the charcoal in place beneath the cooking grills. However, many advantages accrue to starting charcoal ignition in one place in the grill, and later moving the hot coals to the desired cooking
- 30 position.

This invention intends to provide a quicker fire startup time by using, simultaneously, electric heating coils to ignite the fire and an air blower, pumped by the air supply unit, at variable volumes as needed. After hot charcoals are transferred to the charcoal rack, air vents and diverters are used to direct evenly distributed airflow to maintain the high and even temperature. The reversible air supply unit functions not only as an air supply device that forces air into the grill, to hasten the burning of the charcoal, but also as a vacuum cleaning device that sucks out the charcoal ash after cooking. Alternatively, the forced air supply and vacuum unit can be two different devices, with two different connection points to the grill. The variable nature of the air supply allows control of the grill temperature during cooking.

In a preferred embodiment, the electric heating coils can be operated in the absence of charcoal to heat a side burner for warming or cooking of food.

Although the present invention is operable as portrayed, it is understood that it will often, indeed usually, be located on a stand or island of some type. Many types of stands are known in the prior art. Stands may be rigid, such as often is encountered in built-in grills: table tops, countertops, and the like, generally with fire-resistant surfaces such as tile or other ceramic or synthetic base. Alternatively, stands may be freestanding, as in carts and metal stands. Such stands often have wheels, imparting portability to the grill.

No stand is predetermined for the present invention. The present invention is envisioned to work in concert with a variety of stands, both freestanding and as built-ins. Often such stands are custom designed for each customer, and thus cannot be anticipated. Nevertheless, the present invention is designed to work with all types of stands that are designed for conventional barbecue grills.

Description of the Related Art

US patent 2,691,368 to A.J. Hood discloses a barbeque unit which utilizes a regulated forced draft to simplify the igniting process and is also used to some extent during cooking process.

US patent 4,823,684 to Traeger et al. discloses a barbeque unit that utilizes an electric gear motor, mounted to the unit and with an output shaft connected.

5 US patent 4,209,006 to Marsalko discloses a barbeque unit which utilizes a set of controllable louvered openings and a set of uncontrollable openings in combination with a forced air draft device for directing air through the openings and onto the substance being barbequed.

10 US patent 5,176,124 to Wrasse discloses a barbeque unit that utilizes a forced air blower to provide sufficient oxygen to the firebox.

None of the above cited art nor any art discovered discloses a barbeque unit displaying an attached reversible vacuum utilized for directing air and for cleaning the unit. No retractable
15 racks have been found in the prior art.

In view of the inefficiencies of prior barbeque grills, a feature of the present invention provides an improved and easier way to preheat the charcoal and transfer to the cooking area under the grills.

20 Other objects and advantages of the present invention will become apparent from the following descriptions, taken in connection with the accompanying drawings, wherein, by way of illustration and example, an embodiment of the present invention is disclosed.

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Summary of the Invention

The primary object of the invention is to deliver an outdoor grill and barbecue cooker that combines the advantages of electric and charcoal cooking.

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Another object of the invention is to provide a way to grill with charcoal without the inherent

drawbacks found in charcoal-only grills.

Another object of the invention is to hasten the combustion of the charcoals by igniting the charcoals, which are placed in a basket over the electric ignition coils, and by a controllable
5 airflow from the vacuum to achieve a rapid startup process.

Another object of the invention is to provide a method for temperature control of greater precision than found in conventional charcoal-only grills.

10 Another object of the invention is using the built-in air baffles and diverters to direct a steady air stream into the cooking chamber to maintain uniform heat temperature. This process will provide an evenly distributed air throughout the cooking process.

Another object of the invention is to attain different charcoal cooking temperatures using
15 movable charcoal racks. There are different positions available for charcoal holding racks below the top rack used for cooking food. The charcoal racks can be placed directly below the top rack, for direct grilling of food. The charcoal racks can alternately be placed near the side of the grill. This placement is used to hold the charcoals away from the cooking grill surface in a position suitable for indirect cooking of food.

20 Another object of the invention is to provide means for direct or indirect cooking of food placed on a rotisserie option.

Another object of the invention is to provide a method for ease of cleanup after grilling.

25 Other objects and advantages of the present invention will become apparent from the following descriptions, taken in connection with the accompanying drawings, wherein, by way of illustration and example, an embodiment of the present invention is disclosed.

30 The drawings constitute a part of this specification and include exemplary embodiments to the invention, which may be embodied in various forms. It is to be understood that in some

instances various aspects of the invention may be shown exaggerated or enlarged to facilitate an understanding of the invention.

5 **Brief Description of the Drawings**

FIG. 1 is a perspective view from above of the top lid only of the present invention.

FIG. 2 is a perspective view of the support bracket for the top lid.

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FIG. 3 is a perspective view from above of the main chassis of the present invention. The cover, the upper floor within the main chassis, and the chassis internal structure is not shown in this Figure.

15 FIG. 4 is a perspective view from the front and side of the present invention, with lid closed. The chassis internal structure is not shown in this Figure.

FIG. 5 portrays a view of the side of the present invention, with lid closed.

20 FIG. 6 is a cutaway perspective view of the main chassis of the present invention, showing the floors and firebox shroud.

FIG. 7 is a cutaway perspective view of the main chassis of the present invention, showing the lower floor and firebox shroud.

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FIG. 8 is a cutaway view showing the upper and lower floors of the main chassis.

FIG. 9 is a cutaway view showing the top and bottom floors of the main chassis, and the firebox in position in the firebox shroud.

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FIG. 10 is a cutaway view showing the top and bottom floors of the main chassis, and details of the floors including the firebox shroud.

FIG. 11 is a cutaway view of the main chassis viewed from above, with support racks visible.

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FIG. 12 is a cutaway perspective view of the main chassis, with support racks and support rails visible.

FIG. 13 A is a view of the firebox lid. FIG. 13 B is a view of the wire mesh spark arrestor.

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FIG. 14 is a cutaway view of the firebox, featuring internal heating elements.

FIG. 15 is another cutaway view of the firebox, featuring internal support rails for charcoal baskets, and lower air baffles.

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FIG. 16 is a cutaway perspective view of the main chassis of the present invention, showing the cooking grills in position.

FIG. 17 is a cutaway view of the upper floor of the main chassis of the present invention, showing three ashtrays in place.

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FIG. 18 is a view showing two covers for small ashtrays {ashtrays portrayed in Fig. 19}.

FIG. 19 is a view of the two small ashtrays corresponding to the covers of Fig. 18.

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FIG. 20 is a cutaway perspective view of the larger ashtray, featuring air vent holes.

FIG. 21 is a view of the pressure equalization lid.

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FIG. 22 is a cutaway perspective view of the larger ashtray, with pressure equalization lid.

FIG. 23 shows the air manifold system.

5 FIG. 24 is a cutaway view of the main chassis with air manifold system in place.

FIG. 25 is a view of the charcoal baskets, used for holding the charcoal throughout the ignition and cooking process.

10 FIG. 26 is a cutaway view of the main chassis with optional rotisserie system in place.

Detailed Description of the Preferred Embodiments

Detailed descriptions of the preferred embodiment are provided herein. It is to be understood,
15 however, that the present invention may be embodied in various forms. Therefore, specific details disclosed herein are not to be interpreted as limiting, but rather as a basis for the claims and as representative basis for teaching one skilled in the art to employ the present invention in virtually any appropriately detailed system, structure or manner.

20 Referring now to FIG. 1 we see a perspective view of the cover or lid of the present invention from above. Top lid **20** is attached by hinges along one edge to the inner support bracket of the main shell of the invention at pivot points **4**. Said top lid includes slots **2** that can accommodate a rotisserie unit. Said top lid is raised and lowered by means of handle **6**.

25 FIG 2 displays the top lid of the present invention from a cutaway rear view. This shows bolt connections **8** by which means the top lid is affixed to the main grill by means of bolting to the inner support bracket.

The main shell of the invention is displayed in cutaway view from above in FIG. 3, with
30 upper internal floor and other internal equipment. At the top are rolled and reinforced edges along each long side and each short side of the main chassis **10**. Said edges are numbered **16**

for long edges and **18** for short edges. These edges are used to support the grilling racks, which in turn support the food throughout the cooking process.

Also seen in FIG. 3 is the lower floor of the main chassis, although the upper floor is omitted for clarity. At the bottom of the floor, two rectangular cutouts areas are visible. The larger area **12** is the cutout area in which is fitted the firebox shroud (which in turn encloses the firebox). The smaller cutout area **14** in the floor admits the air manifold. The firebox extends below the bottom of the firebox shroud and through cutout area **12**.

Turning now to FIG. 4, we see the preferred embodiment of the present invention in its entirety, as a shell. Internal equipment has been omitted for clarity.

In this view, we see the main chassis **10**, which has a lid **20** and the cutout areas **12**, **14** in the bottom. This view clearly shows bracket **30**, which supports lid **20**.

FIG. 5 shows the preferred embodiment of the present invention from a side view.

FIG. 6 is a cutaway perspective view of the main chassis of the present invention, showing the floors and firebox shroud **22**. In upper floor **24** are seen 3 cutouts. These are used for the placement of ashtrays, and will be discussed in detail below.

FIG. 7 shows more detail of the firebox shroud **22**, from a side cutaway view with sidewall and upper floor removed. The side flanges **28** on the shroud are visible. These are used as heat sinks, and as supporting arms for the firebox when placed in the shroud. Note that the shroud base seams **26** are completely welded to the lower floor. This is to provide a watertight seam, useful during cleanup operations.

FIG. 8 is a cutaway view showing the upper floor **24** and the lower floor **34** of the main chassis. Again, internal equipment and racks, and most of the upper lid, are omitted for clarity. The cutout areas for firebox shroud, air manifold, and ashtrays are visible.

FIG. 9 is a cutaway view showing the top and bottom floors of the main chassis, and the firebox **32** in position in the firebox shroud **22**. It can be seen that the firebox extends below the level of the lower floor of the main chassis. The top edges **38** of the firebox flare out on all sides, and rest directly on the flanges **28** of the firebox shroud. The firebox, which houses the charcoal during the charcoal ignition process, is thus easily removed and replaced when at ambient temperature.

FIG. 10 shows another cutaway side view of main chassis **10**. In this view floors, firebox shroud **22**, larger cutout area **42** in the upper floor, and smaller cutout areas **44** are visible. Both **42** and **44** house ashtrays when needed.

FIG. 11 is a cutaway view of the main chassis viewed from above. In this figure, we encounter the charcoal support racks. The racks are themselves supported by support rails on the inner walls of the main chassis **10**, and lie just above the upper floor. (Support rails will be clearly visible in FIG. 15.) Smaller charcoal racks **46** are used in the vicinity of the firebox and firebox shroud. Larger charcoal racks **48** are used when supporting charcoal in an area away from the firebox and shroud.

FIG. 12 is a cutaway view of the main chassis from a perspective side view. This shows the firebox shroud **22**, with side flanges **28**, and charcoal holding racks **46** (small) and **48** (large). Side rails **36** support the charcoal holding racks. Although the upper floor of the main chassis is not visible in this view, it lies just below the level of the charcoal holding racks.

FIG. 13A shows the lid **52** for the firebox shroud. This is normally used only during cleanup operations. FIG 13B illustrates the wire mesh spark arrestor **50**, which is used primarily during the charcoal ignition process.

FIG. 14 shows the firebox **32**, where charcoal is ignited. Visible are electric heating elements **54**, bottom hole **62**, and end hole **64**. For forced air, a pipe is connected to **64**, and forced air

introduced into the firebox via the pipe from an external air blower. Also seen are the upper flanges **38** on the firebox. These flanges are used to support the firebox in the firebox shroud.

FIG. 15 is a continuation of the cutaway side view of the firebox **32**, showing additional
5 internal detail. Air diverters **58** are shown to promote airflow and air contact with the charcoal. Side rods **56** are used to support the charcoal holding baskets. The pipe **66** connecting the forced air supply from the external air blower to the firebox is displayed.

FIG. 16 shows the top cooking grills **60** atop the chassis body **10**. Also shown is the lid
10 support bracket **30**. Most of the chassis internals are omitted for clarity.

FIG. 17 is a view of the upper floor **24** within the main chassis body. Large ashtray **72**, small ashtrays **74**, and cutout area **40** for the firebox and firebox shroud are displayed.

15 FIG. 18 displays lids that can be used to cover small ashtrays **74**. The small ashtrays **74** are seen in FIG. 17 in place, and alone in detail in FIG. 19.

FIG. 20 shows the detail of larger ashtray **72**. Air holes in the bottom are visible.

20 FIG. 21 displays the pressure-equalizing lid **70**. Its use is portrayed in FIG. 22, where it is shown in place in the bottom of ashtray **72**.

FIG. 23 displays the air manifold box **84**. This manifold is attached to the bottom of the main chassis via bolts through the attached manifold support brackets **88**. Also enclosed by the
25 manifold are the air induction tube **80**, and the cleanout tube **82**. The air induction tube takes ambient air in by unassisted flow, as opposed to pipe **66**, which delivers forced air to the firebox.

FIG. 24 displays the attachment of the air manifold box **84** to the bottom of main chassis **10**.
30 Tubes **80** and **82** are visible.

The charcoal holding baskets are displayed in FIG. 25. This is where the charcoal is held during the entire operation, from ignition through cooking, until cleanup occurs. The baskets are preferably made of expanded metal grid.

- 5 FIG. 26 shows the preferred embodiment of the present invention with the optional rotisserie unit in place and operating.

Operation of the present invention

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In the preferred mode operation of the present invention, charcoal is ignited and heated in baskets **86**, by means of activating the electric heating coils, with optional air blowing to accelerate ignition. An optional wire mesh spark arrestor **50** attached to the top of firebox **32** will alleviate the problem of flying sparks during the charcoal ignition process. Forced air is
15 preferably supplied by an attached air blower capable of supplying at least 50 cubic feet per minute (cfm) of air to the grill.

The baskets **86** containing hot charcoal are then transferred to charcoal holding racks **46** and/or **48**. The hot charcoal is allowed to remain on these racks for as long (or short) a period
20 of time as desired, to cook food on cooking grills **60**. The food is placed directly over the hot charcoal for grilling, or moved away for indirect cooking, such as baking or roasting. Grill cover **20** is left in open position for grilling or handling of food, or closed for indirect cooking. While the food is cooking, ashtrays are left in place to collect the ash produced. The air blowing can continue during the cooking phase, although preferably at a lower output
25 level, to increase the lifetime of the hot charcoal.

To use the rotisserie, the rotisserie unit **90** is attached to the support bracket **30**. Cooking grills **60** are removed from the main chassis. The pressure-equalizing lid **70** is installed as shown in FIG. 22, roughly in the center of the main chassis. After charcoal ignition, the
30 charcoal baskets **86** containing hot charcoal are moved to positions on the charcoal holding racks near the edges of main chassis **10**. Thus, the hot charcoal remains centered over the air

vents, and air continues to circulate around the charcoal. However, the food is not directly over the hot charcoal. When the cover **20** is lowered, the food will be cooked by indirect heat from the hot charcoal, while revolving around the spit of the rotisserie.

5 Cleanup after cooking can be effected in a number of different ways. For simple cleanup, the grill unit is allowed to cool to ambient temperature, and the ashtrays **72, 74** are simply removed and emptied. Optionally, a vacuum unit can be connected to pipe **82**, and reduced pressure applied to remove residual ash throughout the main chassis.

10 For deeper cleaning, lid **52** is attached to the top of firebox **32**, after the grill is cooled. The unit can then be washed by means of a hose, optionally with soap, and scrubbed clean as desired. The vacuum can be applied to assist draining of the water through the manifold box **84** after cleaning.

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While the invention has been described in connection with a preferred embodiment, it is not intended to limit the scope of the invention to the particular form set forth, but on the contrary, it is intended to cover such alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

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